What is claimed is:

1. A method of processing a plurality of source images, comprising the steps of:

encoding the plurality of source images in a composite image, wherein illuminant-neutral GCR is employed to alter to the composition of one or more source images encoded for rendering as a composite image;

rendering the composite image on a substrate by use of a plurality of colorants; and

recovering at least one of the encoded source images from the rendered composite image, such that the recovered source image is made distinguishable, by subjecting the rendered composite image to a narrow-band illuminant that is selected to reveal the source image.

2. The method of **claim 1**, wherein the recovered source image is made visually detectable by an observer.

3. The method of **claim 1**, wherein the source image encoding step further comprises the step of mapping values representative of each source image pixel to a corresponding pixel value in a respective colorant image plane.

4. The method of **claim 3**, wherein the mapped values are determined according to at least one of the following: (a) the trichromacy of human visual response to colorant/illuminant interaction; (b) the spectral characteristics of the colorants selected for rendering the composite image, and (c) the spectral characteristics of the narrow-band illuminant(s) used for recovering the source image.

5. The method of **claim 3**, wherein the source image encoding step further comprises the steps of:
converting at least one source image to a monochromatic separation image; and
mapping the monochromatic separation image to a corresponding colorant image plane in the composite image.

6. The method of **claim 5**, wherein a narrowband colorant is assigned to a respective colorant image plane of the composite image, and the mapped values in the respective colorant image planes represent the relative amounts of the narrowband colorant to be deposited in the rendered composite image.

7. The method of **claim 1**, wherein the composite image is rendered as pattern of deposited narrowband colorants, each of which narrowband colorants exhibiting a predefined spectral reflectance characteristic.

8. The method of **claim 7**, wherein the selected narrowband colorant exhibits a predefined narrowband absorption characteristic.

9. The method of **claim 8**, wherein the selected narrowband colorant is selected from the group of cyan, magenta, and yellow colorants.

10. The method of **claim 1**, wherein the narrowband illuminant is selected from the group of red, green, and blue illuminants.

11. The method of **claim 1**, wherein the rendered composite image is rendered using a digital color electrophotographic printer.

12. An imaging system, comprising:

a spectral multiplexer for receiving image data representative of plural source images and for processing the image data to encode the source images in a composite image, wherein illuminant-neutral GCR is employed to alter to the composition of one or more source images encoded for rendering as a composite image and for providing a composite image data signal;

an image rendering device which is responsive to the spectral multiplexer for receiving the composite image data signal and for rendering the composite image on a substrate; and

a demultiplexer for subjecting the rendered composite image on the substrate to illumination by a narrowband illuminant having a selected spectral power distribution, such that at least one the encoded source images is made detectable.

13. A system for spectral multiplexing of plural source images, comprising a spectral multiplexer for receiving image data representative of a plurality of source images and for processing the image data to encode the plurality of source images into a composite image data signal, wherein illuminant-neutral GCR is employed to alter to the composition of one or more source images encoded for rendering as a composite image and wherein values representative of each source image pixel are mapped to a corresponding pixel value in a respective colorant image plane.

14. The system of **claim 13**, wherein the mapped values are determined according to at least one of the following: (a) the trichromacy of human visual response to colorant/illuminant interaction; (b) the spectral characteristics of the colorants selected for rendering the composite image, and (c) the spectral characteristics of the narrow-band illuminant(s) used for recovering the source image.

15. The system of **claim 13**, further comprising an image recording device for receiving the composite image in the form of a composite image data file and for rendering the corresponding composite image as a rendered composite image in a plurality of narrowband colorants on a substrate.

16. The system of **claim 15**, wherein the image recording device is provided in the form of a printer for printing the composite image on a substrate.

17. The system of **claim 16**, wherein the printer include narrowband colorants selected for their apparent darkness when exposed to at least one of red, green, and blue illuminants.

18. A system for spectral demultiplexing of a rendered composite image having encoded therein a plurality of source images, wherein illuminant-neutral GCR is employed to alter to the composition of one or more source images encoded for rendering as a composite image, comprising a demultiplexer for subjecting the rendered composite image to illumination by an illuminant having a selected spectral power distribution such that at least one of the encoded source images is made distinguishable.

19. The system of **claim 18**, wherein the composite image is formed from colorants selected from the group of cyan, magenta, and yellow colorants, and wherein the demultiplexer further comprises a controller and an illuminant source responsive to control by illuminant source control signals provided by the controller, and wherein the illuminant is a narrowband illuminant is selected from the group of red, green, and blue illuminants.

20. The system of **claim 19**, wherein the controller further comprises a computer, operable according to control programs for generating one or more of the illuminant source control signals, and wherein the illuminant source further comprises a CRT display responsive to the illuminant source control signals for generating a defined field of illumination of a narrowband illuminant, whereby a rendered composite image on a substrate may be located within the field of illumination and thereby subjected to illumination by the narrowband illuminant.

21. A method of processing a plurality of source images, comprising the steps of:

encoding the plurality of source images in a composite image, wherein illuminant-neutral GCR is employed to alter to the composition of one or more source images encoded for rendering as a composite image, and wherein a gray component replacement fraction in the illuminant-neutral GCR is spatially modulated, so as to increase confusion;

rendering the composite image on a substrate by use of a plurality of colorants; and

recovering at least one of the encoded source images from the rendered composite image, such that the recovered source image is made distinguishable, by subjecting the rendered composite image to a narrow-band illuminant that is selected to reveal the source image.

22. A method of processing a plurality of source images, comprising the steps of:

encoding the plurality of source images in a composite image, wherein illuminant-neutral GCR is employed to alter to the composition of one or more source images encoded for rendering as a composite image, and wherein a gray component replacement fraction in the illuminant-neutral GCR is implemented to encode an additional, low-resolution source image intended for recovery under illumination by a multiband illuminant;

rendering the composite image on a substrate by use of a plurality of colorants; and

recovering at least one of the encoded source images from the rendered composite image, such that the recovered source image is made distinguishable, by subjecting the rendered composite image to at least one of: (a) a multiband illuminant and (b) a narrowband illuminant that is selected to reveal the source image.

23. An imaging system, comprising:

a spectral multiplexer for receiving image data representative of plural source images and for processing the image data to encode the source images in a composite image, wherein illuminant-neutral GCR is employed to alter to the composition of one or more source images encoded for rendering as a composite image and for providing a composite image data signal;

an image rendering device which is responsive to the spectral multiplexer for receiving the composite image data signal and for rendering the composite image on a substrate; and

a spectral demultiplexer for subjecting the rendered composite image on the substrate to illumination by an illuminant having a predefined spectral power distribution for which at least one of the first and second source images was encoded, such that a recovered source image derived from the encoded source image is recovered when the rendered composite image is subjected to the illuminant.

24. The imaging system **of claim 23**, wherein the spectral multiplexer is operable for mapping values representative of each source image pixel to a corresponding pixel value in a respective colorant image plane.

25. The system of **claim 24**, wherein the mapped values are determined according to at least one of the following: (a) the trichromacy of human visual response to colorant/illuminant interaction; (b) the spectral characteristics of the colorants selected for rendering the composite image, and (c) the spectral characteristics of the narrow-band illuminant(s) used for recovering the source image.

26. The imaging system of **claim 23**, wherein the spectral multiplexer is operable for spectrally encoding a polychromatic source image by mapping pixel values representative of plural separation images to a corresponding pixel value in one or more of a plurality of colorant image planes.

27. The imaging system of **claim 26**, wherein the separation images define the polychromatic source image according to the separation image planes, and wherein the composite image is defined in a spectrally multiplexed (SM) image plane having patterns of pixels, whereby at each location in the SM image plane, a pixel value representing one or more spectral components may be present, and wherein the pixel value patterns are determined according to the gray level of the corresponding pixels in one or more of the separation image planes.

28. The imaging system of **claim 27**, wherein the spectral multiplexer is operable for is spectrally multiplexing to the SM image plane wherein certain pixels includes color values representative of color separation image data from more than one source image plane.

29. The imaging system of **claim 26**, wherein the spectral multiplexer is operable for converting the polychromatic source image to an array of respective monochromatic separation images, each of which being mapped to a corresponding colorant image plane in the composite image, and the plurality of separation images being mapped to a corresponding plurality of colorant image planes in the composite image.

30. The imaging system of **claim 24**, wherein the spectral multiplexer is operable for assigning each colorant to a respective colorant image plane of the composite image, and the colorant values in the respective colorant image planes represent the relative amounts of colorant to be deposited in the rendered composite image.

31. The imaging system of **claim 23**, wherein the spectral multiplexer is operable for receiving image data representative of a polychromatic source image, and converting, when necessary, the array of image data representative of the polychromatic source image to respective separation images, and wherein the spectral multiplexer is operable for receiving second image data which is representative of a second source image, and for converting, when necessary, the second source data to provide a respective monochromatic image, wherein the separation images and the monochromatic image are mapped to corresponding ones of plural colorant image planes in the composite image, and wherein the resulting composite image incorporates spectrally encoded information representing both the first (polychromatic) source image and a monochromatic version of the second source image.

32. The imaging system of **claim 23**, wherein the spectral demultiplexer is operable for subjecting the rendered composite image to an incident light spectrum having a selected spectral power distribution in at least two of three selectable bands of radiant energy.

33. The imaging system of **claim 23**, wherein the spectral demultiplexer includes a controller and an illuminant source responsive to illuminant source control signals provided by the controller, and wherein the illuminant source includes one or more light sources for providing desired spectral power distributions in plural selectable bands of radiant energy.

34. The imaging system of **claim 23**, wherein the selectable bands correspond to the long, medium, and short (LMS) wavelength bands of the light spectrum.

35. The imaging system of **claim 23**, wherein the image rendering device employs at least one selected colorant selected for its narrowband absorbing properties so as to appear dark when subjected to a first illuminant having a spectral power distribution that lies substantially within the spectral absorption band of the selected colorant, and to appear light when subjected to a second, differing illuminant having a spectral power distribution that lies substantially outside of the spectral absorption band of the selected colorant.

36. The imaging system of **claim 23**, wherein the spectral multiplexer is provided in the form of a computer for receiving image data files representative of a plurality of source images and for encoding the image data files as a composite image data file.

37. The imaging system of **claim 23**, wherein the spectral multiplexer is operable to perform a dynamic range determination so as to provide a maximum usable contrast in a recovered normalized image.

38. The imaging system of **claim 23**, wherein the spectral multiplexer is operable to perform a dynamic range determination by permuting the allocation of the source image to differing monochromatic separations, in an image-dependent fashion, so as to restrict the gamut of the source image only to the extent required by the source image.

39. The imaging system of **claim 23**, wherein the dynamic range determination includes limiting the gamut of the source image.

40. The imaging system of **claim 23**, wherein the spectral multiplexer is operable to perform the addition of image masking signals to the source image.

41. The imaging system of **claim 23**, wherein the image recording device is provided in the form of a printer for printing the composite image on a substrate.

42. The imaging system of **claim 41**, wherein the printer includes one or more of cyan, magenta, yellow, and black colorants selected for their apparent darkness when exposed to complementary illuminants.

43. The imaging system of **claim 23**, further comprising at least one of a composite image file storage device and a composite image file transmission device.

44. The imaging system of **claim 23**, wherein a gray component replacement fraction in the illuminant-neutral GCR is implemented to encode one of the first and second source images intended for recovery under illumination by a multiband illuminant; and wherein the spectral demultiplexer is operable for subjecting the rendered composite image to at least one of: (a) a first illuminant that is selected to reveal a selected one of the first and second source images and (b) a second illuminant that is selected to reveal the remaining one of the first and second source images.

45. The imaging system of **claim 44**, wherein the first illuminant is a narrowband illuminant and the second illuminant is at least one of a multiband illuminant and a wideband illuminant.